REMARKS

The Examiner objected to the Abstract and rejected claim 58 under 35 U.S.C. § 112, second paragraph. Claims 34, 35, 38, and 44-47 are rejected as being anticipated by *Pringle et al.* '951. Claims 1, 2, 10, 12, 13, 15, 17-19, 21, 23-25, 38-42, 48-52, 57, 61, and 62 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Horstmeyer et al.* '814 in view of *Walling* '415. Claims 17, 19, 20, 33, 47, 55 and 56 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Pringle et al.* '951 in view of *Walling*. Claim 43 is rejected under 35 U.S.C. § 103(a) as being unpatentable over *Pringle et al.* '951 in view of *Collin et al.* '145. Claims 3, 7, and 11 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Horstmeyer et al.* '814 as modified by *Walling*, as applied to claim 1, further in view of *Williams et al.* '337. Claims 22, 59, and 60 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Horstmeyer et al.* '814 as modified by *Walling*, as applied to claim 21, further in view of *Collin et al.* Claims 53 and 58 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Horstmeyer et al.* '814 as modified by *Walling*, as applied to claims 17 and 21, respectively, further in view of *Wu* '267. Claim 54 is rejected under 35 U.S.C. § 103(a) as being unpatentable over *Pringle et al.* '951 as modified by *Walling*, as applied to claims 17, further in view of *Dismukes* '856.

A Proposed Drawing Amendment is submitted concurrently herewith adding reference numerals in Figure 5 and changing a reference numeral in Figure 6.

With respect to the objection to the Abstract, the Abstract has been amended pursuant to the Examiner's suggestion. Further with respect to the rejection of claim 58 under the second paragraph in § 112, claim 58 has been amended to depend from claim 53 and provide proper antecedent basis.

Claims 34, 35 38 and 44-47 were rejected under § 102(b) as being anticipated by *Pringle at al.* '951. *Pringle at al.* discloses a bottom hole drilling assembly disposed on the end of coiled tubing 20 which includes one or more umbilicals or control lines which pass <u>through the flowbore of</u> coiled tubing 20 to the earth's surface where it is connected to various controls 56, 58. Thus, *Pringle et al.* does not teach a communication link <u>through a wall</u> of the pipe 20 as represented by the Examiner. There is no teaching of the materials from which coiled tubing 20 is made and particularly whether the coiled tubing 20 is made of a non-metallic material. There is in fact several indications in *Pringle et al.* that coiled tubing 20 is metal coiled tubing since at Col. 4, lines 18-21, the coiled tubing 20 is described as having the advantage of reducing the risk

of buckling and/or twisting of coiled tubing. Further, at Col. 4, lines 35-40, it states that the coiled tubing is forced into the borehole by the coiled tubing injector 22. Still further, at Col. 3, lines 32-35, it is suggested that the bit may be rotated with a surface rotary table or a top drive. These would require a metal drill pipe since composite coiled tubing can not be rotated to rotate the bit. Still further, *Pringle et al.* includes an orienting tool 48 to rotate the tool face. A first portion 50 of tool 48 is attached to the coiled tubing 20 and a second portion 52 is connected to the bottom hole assembly components. Thus to rotate the tool face, orienting tool 48 rotates the second portion 52 with respect to the first portion 50. Therefore the coiled tubing must hold the first portion stationary so that the second portion 52 can rotate the tool face. A composite coiled tubing could not withstand the torque of this relative rotation and therefore could not hold the first portion 50 stationary. For these reasons and because *Pringle et al.* does not specifically disclose coiled tubing 20 as a composite coiled tubing, Applicant asserts that coiled tubing 20 is metal coiled tubing and not composite coiled tubing as represented by the Examiner.

Pringle et al. discloses a bottom hole drilling assembly including a drill bit 26, a near bit stabilizer 28, a downhole motor 30, an articulated sub 32 having internal control mechanisms to adjust a bend in the sub, a steering tool 34 which passes periodic measurements of borehole azimuth and inclination to the surface, an upper stabilizer 38, a thruster 40, an orienting tool 48 for rotating the tool face of the drill bit 26, and a disconnect coupling 54. The downhole thruster 40 includes at least one pad 42 that moves outwardly and engages the wall of the borehole 38 anchoring one portion 44 of the thruster 40 while a second portion 46 extends. The pad 42 is then retracted and the weight of the assembly is used for further drilling. There is no teaching of a thruster which moves both forward and backward in the borehole. Thus, the thruster 40 of *Pringle et al.* is not a propulsion system as represented by the Examiner. The thruster 40 only applies a force on the bit and does not provide a motive force on that portion of the bottom hole assembly above the thruster 40 or on the coiled tubing 20. A propulsion system not only applies a downward force on the bit but also applies at least a downward force on the string. See page 29, lines 12-19 of the present application. Further, *Pringle et al.* at Col. 4, lines 33-35, refers to U.S. Patent 5,316,094 for details of thruster 40. The '094 patent describes a hydraulic line extending to the surface to supply fluid to the thruster. Thus the thruster does not use circulation fluids or drilling fluids for power.

With respect to claim 34, as amended, *Pringle et al.* does not teach a composite coiled tubing as discussed above. Further, *Pringle et al.* does not teach the claimed steerable assembly and particularly does not teach an output shaft having an articulation joint allowing the output shaft to have a bend angle and an angular orientation of the bend angle. *Pringle et al.* teaches an upper orienting tool 48 and a lower articulated sub 32, both above the downhole motor 30 and thus unassociated with the output shaft of motor 30. The articulated sub 32 has a housing which can have a bend angle and the orienting tool 44 can rotate a second portion 52 with respect to a first portion 50 a desired number of degrees to change the angular orientation of the bend angle of the articulated sub 32 and thus the path of drill bit 26. Still further, *Pringle et al.* also does not teach a steering assembly which does not rotate the thruster 40. Orienting tool 44 must rotate second portion 52 attached to the thruster 40 to alter the angular orientation of the bit 26. Even further, *Pringle et al.* does not teach a prime mover and particularly a prime mover which may move the bit upstream or downstream. The thruster 44 of *Pringle et al.* only provides a downward force to advance the drill bit and is not adapted to move the drill bit upstream. For al these reasons, claim 34 is distinguishable from the teachings of *Pringle et al.*

With respect to claim 35, as amended, *Pringle et al.* does not teach a pipe with a communication link disposed <u>within</u> a wall of the pipe. *Pringle et al.* does not teach an articulated joint between the downhole motor and drill bit or an articulation joint having a bend angle and an angular orientation of the bend angle. *Pringle et al.* does not teach a steerable assembly which adjusts both the bend angle and angular orientation of the bend angle of first and second portions at the articulated joint to change direction of a drill bit.

With respect to claim 38, *Pringle et al.* does not teach a string of composite tubes nor composite tubes having one or more conductors disposed in a wall of the tubes. Further, *Pringle et al.* also does not teach composite tubes which are engineered to withstand axial and yield stress placed on the string. Still further, *Pringle et al.* does not teach a propulsion system. Instead *Pringle et al.* teaches a thruster. The thruster only applies a downward force on the bit but applies no force on the drill string. A propulsion system not only applies a downward force on the bit but also applies a force on the string. Even further, *Pringle et al.* describes a thruster having a hydraulic line extending to the surface to supply fluid to the thruster. Circulation fluids are not used.

Claims 44-47 are dependent on claim 38 and therefore are distinguishable for the reasons stated with respect to claim 38. With respect to claim 44, as amended, *Pringle et al.* does not teach an actuator for adjusting the bend angle and angular orientation of the bend angle of a universal joint. With respect to claim 45, as amended, *Pringle et al.* does not teach a steerable assembly which adjusts the bend angle and angular orientation between the drill member and the steerable assembly. With respect to claim 46, as amended, *Pringle et al.* does not teach an articulated joint which adjusts the bend angle and angular orientation between a first portion connected to a downhole motor and a second portion coupled a drill bit. With respect to claim 47, *Pringle et al.* does not teach an electric motor in the steerable assembly.

Claims 1, 2, 10, 12, 13, 15, 17-19, 21, 23-25, 38-42, 48-52, 57, 61 and 62 are rejected under § 103(a) as being unpatentable over *Horstmeyer et al.* in view of *Walling*. Applicant traverses this rejection because it is not obvious to use the production tubing of *Walling* as the drilling umbilical in *Horstmeyer et al.*

Horstmeyer et al. discloses a coilable umbilical 14 which is connected at its upper end to an electronic processor 15 and is connected at its lower end to a drilling tool assembly 21. The drilling tool assembly 21 includes a cutter head 36, a first thruster assembly 39, hydraulic motors 40, a first hydraulic ram assembly 42, a first anchor assembly 44, a downhole sensing device 46, a second hydraulic ram assembly 48, a second anchor assembly 50, a second thruster assembly 52, a coupling U-joint 54, a hydraulic system control device 56, a hydraulic pump 58, an electric motor 60, and a hydraulic reservoir 61, all as shown in Figure 3 of *Horstmeyer et al.*. The hydraulic motors 40 and the first and second anchor and ram units 62, 63 are powered by hydraulic fluid controlled by control device 56 and supplied by hydraulic pump 58 with the hydraulic fluid being supplied from hydraulic reservoir 61. Hydraulic pump 58 is driven by electric motor 60. *Horstmeyer et al.* emphasizes that down hole drill tool system 21 is a self-contained hydraulically powered unit and that the first and second anchor and ram units 62, 63, first and second thruster assemblies 39, 52, and hydraulic motors 40 are powered by hydraulic fluid, and not circulating fluids, to avoid contamination. (See Col. 2, l. 44-46 and Col. 3, l. 1-4). The umbilical 14 includes an inner drilling fluid supply hose 30 and an outer heat shrinkable abrasive proof tubing 33. Lifting cables 22, control wire 24, instrumentation wires 26, a power cable 28 and a hydraulic reservoir make up hose 34 are wrapped in a spiral or straight fashion

about inner hose 30 with the void spaces between the inner hose 30 and outer tubing 33 being filled with a plastic 32.

Walling teaches a flexible production tubing having a submersible pump attached to one end for pumping liquids to the surface where the pressure of the reservoir is insufficient to produce the liquids by natural means. The flexible production tubing 22 includes a production core conduit 32 around which is wrapped a first layer of polyester ribbon material 52 which is received within a nylon sheath 54 around which is wrapped a second layer of polyester ribbon 56 in a partially convoluted, spiral path about sheath 54. Pneumatic/hydraulic conduits 38, 40, power conductors 42, 44, 46, 48 and a signal conductor bundle 50 are wrapped in a spiral or helical fashion around the second layer of polyester ribbon 56 of conduit 32. Conduit 32, with ribbon 52, 56 and sheath 56, together with conduits 38, 40 and conductors 42, 44, 46, 48 are disposed within a injection body 58 that surrounds these conductors and conduits. Injection body 58 is a polyester filler material which is injected into the annulus around the wrapped core conduit 32. A braided sheath 60 of polyester fiber strands immediately surrounds the injection body 58 to provide burst strength to the assembly. Synthethic fibrous strands 36, such as Kevlar, are interwoven or otherwise bonded to the braided sheath 60 and extend axially along the length of the flexible production tubing 22. The braided sheath 60 is encased within a relatively thin-gauged nylon sheath 62 which is in turn encased within a relatively heavy-gauged, high tensile strength nylon sheath 34. Tension loads imposed upon flexible production tubing 22 are applied to the outer sheath 34 and the Kevlar strands 36. Incidental tension loading of the core conduit 32 and of the power conductors and pneumatic/hydraulic conduits is relieved because of the relatively greater tubing length of the inner components as compared with the length of the outer sheath 34 and Kevlar strands 36. (Col. 6, l. 24-31). There is no discussion of any tension loads being placed on any fibers wrapped in tubing 22 and particularly wrapped around conduit 32. The polyester ribbon materials are used for burst strength. (Col. 6, l. 7-12).

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references, when combined, must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both

be found in the prior art, and not based on applicant's disclosure. To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references. When the motivation to combine the teachings of the references is not immediately apparent, it is the duty of the examiner to explain why the combination of the teachings is proper. The ultimate determination of patentability is based on the entire record, by a preponderance of evidence, with due consideration to the persuasiveness of any arguments and any secondary evidence.

There is no suggestion or motivation to combine the teachings of *Walling* with those of *Horstmeyer et al*. *Walling* teaches a flexible production tubing while *Horstmeyer et al* teaches a drill string. The objectives and functional requirements between production tubing and drill strings are different. They have different uses and are subject to completely different loads. Production tubing is static while drill strings are dynamic. Production tubing merely extends from the surface down into the well adjacent the producing formation for transporting fluids in the formation to the surface.

In the case of *Walling*, a submersible pump is suspended on the end of the production tubing to pump the fluids to the surface because there is insufficient down hole pressure to cause the fluids to flow naturally to the surface. Thus, the production tubing of *Walling* is used in a low pressure well, typically a rather shallow well, where the production tubing need only withstand the pressures caused by the submersible pump and the hydrostatic head. A drill string must withstand the internal pressures caused by the drilling fluid flowing through the flowbore of the drill string. Still further, there are pressures applied on the drill string from the annulus around the drill string. Typically a production tubing for a submersible pump need only withstand a pressure up to 1000 psi and often around 500 psi. On the other hand a drilling string typically must withstand pressures of around 5,000 psi and sometimes up to 10,000 psi. Thus a drill string may have to withstand 10 times more pressure than a production tubing with a submersible pump.

Further the tension load is completely different. The weight of the submersible pump is only several hundred pounds, (Col. 3, l. 60-63). Thus the production tubing of *Walling* need only support the weight of the submersible pump and its own weight. A drill string on the other

hand must support a bottom hole assembly. A non-metal drill string does not rotate during drilling and thus the bottom hole assembly must include a downhole motor, bit and other components such as a propulsion system as in *Horstmeyer et al.* Thus, a bottom hole assembly has considerable more weight than a submersible pump. Further the drill string must withstand the dynamic forces caused by the drilling operation including the loads applied by the bit, downhole motor and the propulsion system. Tensile loads on the drill string can be as much as 20,000 to 30,000 psi. Further, the drill string must also be more rugged because it must pass through open borehole in multiple trips into the well while a production tubing passes through a cased borehole in a single trip into the well. For all these reasons, one skilled in the art would not use production tubing of *Walling* as the drill string in *Horstmeyer et al.*

Walling also does not add to the teachings of *Horstmeyer et al.* Both rely upon axial members to support the axial load of the tubing and do not rely upon a fiber wrap. In *Horstmeyer et al.*, lifting cable 22 is used to give umbilical 14 tensile strength, to withstand all of the axial loads placed on the drilling umbilical 14 during drilling, and to be totally independent of the other structure of the drilling umbilical. In *Walling*, Kevlar strands 36 and outer sheath 34 are used to give production tubing 22 tensile strength. Strands 36 are not wrapped around inner conduit 32. Further there is no disclosure in *Walling* that the polyester fiber ribbon is braided or braided in a predetermined pattern around conduit 32. Thus *Walling* teaches no more than *Horstmeyer et al.*

Since *Horstmeyer et al.* does not use the internal drilling fluid supply hose 30, heat shrinkable abrasion tubing 33, or filler plastic 32 to carry the loads placed on the drilling umbilical but instead relies upon lifting cable 22, if one skilled in the art wanted a substitute to carry the loads on a drilling umbilical, one skilled in the art would look for a substitute for the lifting cable 22 and not a substitute for tubular members 30, 33. If one skilled in the art were to look for a substitute for tubular members 30, 33, one skilled in the art would not consider the teachings of *Walling* since the production tubing of *Walling* is not used for drilling. Further if *Walling* were to be considered, one skilled in the art would substitute the Kevlar strands 36 of *Walling* for the lifting cable 22 of *Horstmeyer et al.* and would not consider polyester ribbon which only supplies burst strength. Therefore, if one skilled in the art were to look for a substitute for carrying loads in the *Horstmeyer et al.* drilling umbilical, there is no suggestion, motivation or reason to believe that one skilled in the art would consider the *Walling* production tubing.

With respect to claim 1, neither *Horstmeyer et al.* nor *Walling* teach a liner with fibers wrapped therearound to carry axial load. *Walling* teaches Kevlar strands 36 and outer sheath 34 and *Horstmeyer et al* teaches lifting cable 22. Neither cited reference teaches wrapping the fibers in a predetermined pattern to carry the axial load. Neither reference teaches such a composite tube with a propulsion system attached. Claim 1 has also been amended for purposes other than patentability to broaden claim 1 to include a conductor in the wall of the composite tube. The conductor need not be wrapped within the axial load carrying fibers but may, for example, be located between the fibers and the liner or between the load carrying fibers and other fibers.

Claims 2, 10, 12, 13, 15, and 48-52 are allowable as claiming a patentable system in combination with the elements of claim 1. With respect to claim 2, neither reference teaches a composite tube for achieving substantial neutral buoyancy. With respect to claim 10, neither reference teaches a composite tube in a fiber reinforced matrix. A composite includes a resin or an epoxy to hold the fibers together. A matrix formed by the resin or epoxy binds the fibers together. This maintains the orientation and position of the fibers which then carries the loads. A composite includes a multi-wrap or multi-laminate. If there is just one single wrap with a resin mixture, one skilled in the art would not consider this a composite. With respect to claims 12 and 13, neither reference teaches placing conductors adjacent the load carrying fibers. With respect to claim 15, *Horstmeyer et al.* does not teach a specific passageway through the drill tool assembly 21 for the flow of fluid. *Horstmeyer et al.* states that drilling fluid is pumped through umbilical 14 and passes the drill tool assembly 21 and cutter head 36 to remove cuttings (see col. 7, l. 14-18). It is not clear how *Horstmeyer et al.* intends for drilling fluids to pass the drill tool assembly 21. Further, *Horstmeyer et al.* teaches a path for return drilling fluid <u>within</u> the drilling tool assembly 21 (see col. 10, l. 9-11). With respect to claims 48-50, neither reference teaches a wear layer or pressure layer around the load carrying layers of fibers. With respect to claim 51, *Horstmeyer et al.* does not teach powering a propulsion system with fluids circulating through the liner. With respect to claim 52, neither reference teaches a single housing with traction modules.

With respect to claim 17, neither *Horstmeyer et al.* nor *Walling* teach a liner with fibers wrapped therearound to carry axial load. *Walling* teaches Kevlar strands 36 and outer sheath 34 and *Horstmeyer et al* teaches lifting cable 22. Neither cited reference teaches wrapping the

fibers in a predetermined pattern to carry the axial load. Further the cited references do not teach the fibers forming a wall of non-metallic fibers. Claims 18-19 are allowable as claiming a patentable apparatus in combination with the elements of claim 17. With respect to claim 18, *Horstmeyer et al.* does not teach a bottom hole assembly for a non-drilling well apparatus. With respect to claim 19, as amended, *Horstmeyer et al.* does not teach a propulsion system powered by drilling fluids.

Claim 21 is allowable for the same reasons as expressed with respect to claims 1 and 15. Claims 23-25, 57, 61 and 62 are allowable as claiming a patentable apparatus in combination with the elements of claim 21. With respect to claim 23, as amended, neither cited reference teaches a steering assembly having a actuator to adjust the bend angle and angular orientation of the bend angle between the formation displacing member and bottom hole assembly. With respect to claim 24, as amended, *Horstmeyer et al.* does not teach a propulsion system powered by drilling fluids. With respect to claim 25, neither reference teaches fibers engineered to provide tensile strength to the string. With respect to claim 57, the cited prior art does not teach a bottom hole assembly with a central flow passage about the axis of the assembly. With respect to claim 61, *Horstmeyer et al.* does not teach an electrically actuated steerable assembly. With respect to claim 62, the cited references do not teach the claimed steerable assembly such as the spacer members.

With respect to claim 38, neither *Horstmeyer et al.* nor *Walling* teach composite tubes having layers of fibers engineered to cause the tubes to withstand the axial and yield stress placed on the string. *Walling* teaches Kevlar strands 36 and outer sheath 34 and *Horstmeyer et al* teaches lifting cable 22. Neither cited reference teaches engineering the fibers to carry the loads. Neither reference teaches powering a propulsion system with fluids circulating through the composite tubes.

Claims 39-42 are allowable as claiming a patentable apparatus in combination with the elements of claim 38. With respect to claims 39 and 40, neither reference teaches powering a propulsion system utilizing circulating fluids. With respect to claim 41, neither reference teaches the recited density range. With respect to claim 42, neither reference teaches a composite tube made of a fiber reinforced matrix. See also the discussion with respect to claim 10.

Claims 17, 19, 20, 33, 47, 55, and 56 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Pringle et al.* '951 in view of *Walling*. There is no suggestion or motivation to

combine the teachings of *Walling* with those of *Pringle et al.* *Walling* teaches a flexible non-metallic production tubing while *Pringle et al.* teaches a metal coiled tubing drill string. The objectives and functional requirements between production tubing and drill strings are different. They have different uses and are subject to completely different loads. Production tubing is static while drill strings are dynamic. Production tubing merely extends from the surface down into the well adjacent the producing formation for transporting fluids in the formation to the surface. See the discussion on production tubing and drill strings with respect to combining *Walling* with *Horstmeyer et al.*

Still further metallic and non-metallic coiled tubing strings are different. It would not be obvious to substitute a non-metallic production tubing for a metallic coiled tubing drill string for many of the same reasons expressed in the above paragraph. For example, *Pringle et al.* includes an orienting tool 48 to rotate the tool face. A first portion 50 of tool 48 is attached to the coiled tubing 20 and a second portion 52 is connected to the bottom hole assembly components. Thus to rotate the tool face, orienting tool 48 rotates the second portion 52 with respect to the first portion 50. However, the coiled tubing must hold the first portion stationary so that the second portion 52 can rotate the tool face. A composite coiled tubing can not withstand the torque of this relative rotation and therefore could not hold the first portion 50 stationary. For these reasons, one skilled in the art would not use the production tubing of *Walling* for the drill string of *Pringle et al.*

Further with respect to claim 17, neither cited reference teaches wrapping the fibers in a predetermined pattern to carry the axial load. Also neither reference teaches a power conductor adjacent said fibers. Claim 17 is also distinguishable from *Williams '337*. *Williams* teaches that a typical matrix material used in a composite tube is from 100,000 psi to 500,00 psi or greater. *Williams* does not teach a tubular member having a wall of non-metallic fibers having an axial component of modulus of elasticity greater than 500,000 psi. Still further, *Williams* teaches the opposite side wall placement of the conductors, rather than spirally arranged around the liner 18, to provide axial stiffness while promoting preferential bending. *Williams et al.* teaches conductors integral to the tubular member but being arranged in a plane along the minor moment inertia formed in the tubular member.

Claims 19-20 and 55-56 are allowable as claiming a patentable apparatus in combination with the elements of claim 17. Further with respect to claim 19, as amended, *Pringle et al.* does

not teach a propulsion system for moving the drill string. Further with respect to claim 20, *Pringle et al.* does not teach a steering apparatus which changes bend angle and angular orientation of the bend angle of the bit at an articulated joint. Further with respect to claim 55, *Pringle et al.* at Col. 4, lines 33-35, refers to U.S. Patent 5,316,094 for details of thruster 40. The '094 patent describes a hydraulic line extending to the surface to supply fluid to the thruster. Drilling fluids are not used. Further with respect to claim 56, *Pringle et al.* does not teach a three dimensionally, angularly adjustable joint at the steering apparatus.

Further with respect to claim 33, neither cited reference teaches wrapping the fibers in a predetermined pattern to carry axial load. Neither reference teaches a prime mover. *Pringle et al.* only teaches a thruster which places a force on the bit. The thruster does not pull the drill string. Neither reference teaches a steerable assembly connected to the prime mover.

Claim 47 is allowable as claiming a patentable apparatus in combination with the elements of claim 35. Further with respect to claim 47, *Pringle et al.* teaches an electrical pump (U.S. Patent 5,314,032) and does not teach an electrically actuated motor.

Claim 43 is rejected under 35 U.S.C. § 103(a) as being unpatentable over *Pringle et al.* '951 in view of *Collin et al.* '145. Claim 43 is allowable as claiming a patentable apparatus in combination with the elements of claim 38. There is no suggestion or motivation to combine the teachings of *Collin et al.* with those of *Pringle et al.* Collin et al is a connection device for cable and not for composite coiled tubing used in the oilfield. Further, although *Collin et al.* discloses a connection device for connecting cables incorporating optical fibers and metal conductors, *Collin et al.* does not disclose connecting two pipes having a conduit therethrough for the flow of fluids.

Claims 3, 7, and 11 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Horstmeyer et al.* as modified by *Walling*, as applied to claim 1, further in view of *Williams et al.* '337. Claims 3, 7, and 11 are allowable as claiming a patentable apparatus in combination with the elements of claim 1. With respect to claim 3, *Williams et al.* at Col 3 l. 4-10 teaches a typical plastic matrix material used in a composite tube having a modulus of elasticity of between 100,00 and 500,00 psi. or greater and at Col. 4, l. 27-29 teaches a plastic binder in which the fibers are embedded to form a matrix having a modulus of elasticity that exceeds 100,000 psi. Such disclosures do not teach a <u>composite tube</u> having a modulus of elasticity in the range of 500,000 to 10,500,000 psi. With respect to claim 7, the cited prior art does not teach a composite tube having a density which achieves a neutral buoyancy. With respect to claim 11, the cited

prior art does not teach the claimed composite tube and thus does not teach embedding a conductor non-axially in such a composite tube.

Claims 22, 59, and 60 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Horstmeyer et al.* as modified by *Walling*, as applied to claim 21, further in view of *Collin et al.* Claims 22, 59, and 60 are allowable as claiming a patentable apparatus in combination with the elements of claim 21. With respect to claims 22, 59 and 60, there is no suggestion or motivation to combine the teachings of Collin et al with those of *Horstmeyer et al.* or *Walling*. *Collin et al.* is a connection device for cable and not for composite coiled tubing used in the oilfield. With respect to claims 59 and 60, *Collin et al.* does teach the claimed connector.

Claims 53 and 58 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Horstmeyer et al.* as modified by *Walling*, as applied to claim 17, (Claim 58 is now dependent on claim 53) further in view of *Wu* '267. Claims 53 and 58, as amended, are allowable as claiming a patentable apparatus in combination with the elements of claim 17. With respect to claims 53 and 58, the cited references do not suggest a resistivity antenna in the propulsion system.

Claim 54 is rejected under 35 U.S.C. § 103(a) as being unpatentable over *Pringle et al.* '951 as modified by *Walling*, as applied to claims 17, further in view of *Dismukes* '856. Claim 54 is allowable as claiming a patentable apparatus in combination with the elements of claim 17. With respect to claim 54, as amended, the cited prior art does not teach engineering the fibers in the string so to achieve substantially neutral buoyancy.

New claims 64-74 have been added to further claim the present invention.

During the course of these remarks, Applicant has at times referred to particular limitations of the claims which are not shown in the applied prior art. This short-hand approach to discussing the claims should not be construed to mean that the other claimed limitations are not part of the claimed invention. They are as required by law. Consequently, when interpreting the claims, each of the claims should be construed as a whole, and patentability determined in light of this required claim construction. Unless Applicant has specifically stated that an amendment was made to distinguish the prior art, it was the intend of the amendment to further clarify and better define the claimed invention.

If the Examiner has any questions or comments regarding this communication, he is invited to contact the undersigned to expedite the resolution of this application.

Reconsideration of the claims as amended and the allowance thereof is respectfully requested.

Respectfully submitted,

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